## Space Weather Forecast

Issued on Thursday, 19 September 2024 at 13:06 Local

**This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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### Space Weather Forecast Headline: Chance of Minor/Moderate radio blackouts (R1/R2). Minor geomagnetic (G1) and solar radiation storm (S1) risks now reduced.

### Analysis of Space Weather Activity over past 24 hours

**Solar Activity**: Activity has been low, with isolated low-level Common-class flares, the largest of which was at 18/1645UTC from the most complex region on the facing side, near the middle of the Sun, although there were almost overlapping contributions from two in the western solar hemisphere.

There are now five sunspot regions, with a sixth no longer discernible in the northwest. The facing side is dominated by two groups. Firstly, one in the southwest, which is apparently in decline but analysis is hampered by the narrowing viewing angle. Secondly, one near the middle of the Sun, which has a history of Strong-class activity, although the recent trend has been for spreading and slight depopulation of the constituent sunspots. The most-changed group was perhaps a third region in the southeast, which saw development of several minor spots in the ambit of the main part of the group.

Note that there has been no near-infrared ground-based observatory imagery for the past 12 hours for the purpose of identifying 'filament lift-offs' (arcs of plasma that can become Coronal Mass Ejections (CMEs)). A large event high in the Sun's atmosphere was however visible in extreme UV imagery, with a slight western solar hemisphere bias near 40-50N between 19/0600-1200UTC. This may correlate with ejecta becoming visible on other satellite imagery for assessing CMEs in recent hours. This will be analysed when more fully visible. This event possibly excepted, no Earth-directed CMEs were observed.

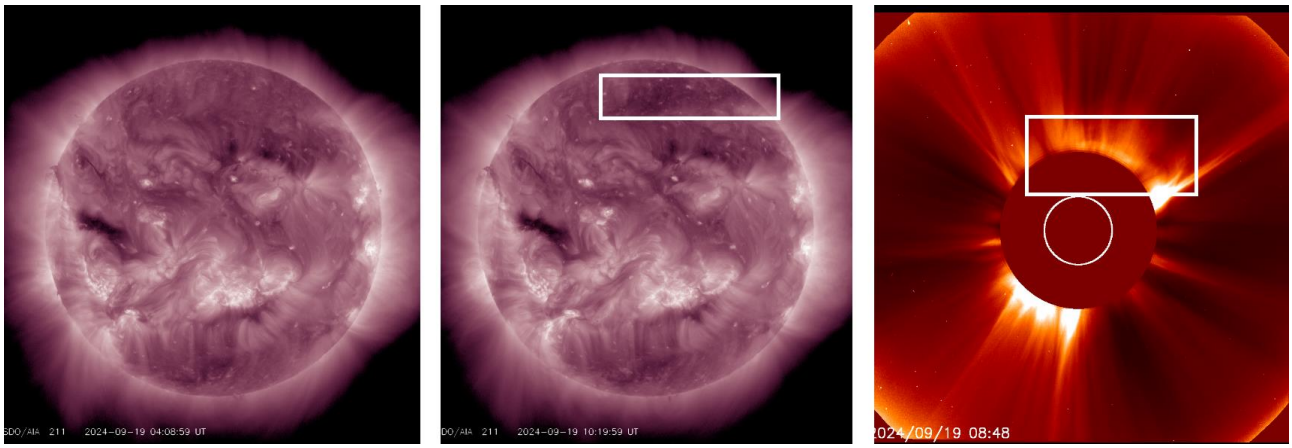


**Figure 1: Possible high solar latitude ‘coronal dimming’ (left before; middle after) seen in false colour extreme UV imagery in current UTC morning. Possible resultant ejecta now becoming visible on rightmost image (boxed white), with analysis pending.**

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**Solar Wind / Geomagnetic Activity:** Solar wind parameters showed a roughly level slightly elevated solar wind speed. This may still reflect waning 16 September CME influence, but with possible contribution from either of two 'coronal holes' (sources of fast wind).

The number of particles in the solar wind remained within typical background levels. The associated magnetic field rose slightly to become slightly elevated into the current UTC morning. The north-south component of this field showed as erratic character, aside from a more reliably anti-aligned period (with Earth's field) between 18/2100 and 19/0500UTC. The anti-aligned phase matched with an increase in geomagnetic activity, provisionally peaking at Minor Storm G1 in the 00-03UTC interval.

**Energetic Particles / Solar Radiation:** No solar radiation storms were observed, with levels now very near resting background in the wake of the enhancement following the 16 September CME.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Low to moderate activity is expected, with a chance of isolated Moderate-class flares. There is a continued slight chance of an isolated Strong-class flare, most probably from the central sunspot region.

**Solar Wind / Geomagnetic Activity:** No CMEs now feature in the forecast. 'Coronal hole' fast wind influence should be minor and should wane by the end of the UTC weekend. The daily slight chance of G1 should fall day on day due to initial waning 16 September CME effects and any fast wind enhancements.

**Energetic Particles / Solar Radiation:** Solar radiation levels will most likely remain at background, with the daily risk of a slight chance of enhancement relaxing. The most likely sources would be any significant flaring from ether of the two largest active regions on the facing side, one of which should depart into the coming UTC weekend to offer progressively less of a contribution.

**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | Yes | 20 | 10 | 5 | 1 |
| Strong | G3 | No | 1 | 1 | 1 | 1 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

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**Radio Blackouts - X Ray Flares:**

| X Ray Flares | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) | Day 2 (00-24 UTC) | Day 3 (00-24 UTC) | Day 4 (00-24 UTC) |
|---|---|---|---|---|---|---|
| Probability | | | (%) | (%) | (%) | (%) |
| Active | R1-R2 M Class | No | 50 | 50 | 40 | 40 |
| Very Active | R3 to R5 X | No | 10 | 10 | 10 | 10 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) | Day 2 (00-24 UTC) | Day 3 (00-24 UTC) | Day 4 (00-24 UTC) |
|---|---|---|---|---|---|---|
| Probability (Exceedance) | | | (%) | (%) | (%) | (%) |
| Active | ≥ S1 | No | 15 | 15 | 10 | 10 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |
| * S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$) | | | | | | |

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